

What is claimed is:

1. An optical signal transmission device, mounted to a vehicle, for propagating an optical signal, used to control operation of a vehicle-mounted apparatus, through a free space along a first propagation path extending from an emitter to a receiver and a second propagation path extending from the emitter to the receiver via a reflector that is disposed outside the emitter and the receiver, the improvement comprising:

an optical axis of a light-emitting element of the emitter or that of a light-receiving element of the receiver being deviated such that a ratio of an incident intensity, at the receiver, of a second optical signal propagating along the second propagation path to an incident intensity, at the receiver, of a first optical signal propagating along the first propagation path is equal to or higher than a predetermined value at or above which a faulty optical-signal transmission is not caused.

2. The optical signal transmission device according to claim 1, wherein at least one of the light-emitting element of the emitter and the light-receiving element of the receiver is disposed upward.

3. The optical signal transmission device according to claim 1, wherein said predetermined value is 25%.

4. The optical signal transmission device according to claim 1, wherein said light-emitting element is disposed that its optical axis coincides with an upstream section, extending from the emitter to the reflector, of the second propagation path.

5. The optical signal transmission device according to claim 1, wherein one or more reflector members are disposed in either or both of upstream sections, extending in the emitter, of the first and second propagation paths.

6. An optical signal transmission device, mounted on a vehicle, for propagating an optical signal, used to control operation of a vehicle-mounted apparatus, through a free space from an emitter to a receiver, the improvement comprising:

5       said transmission device having a reflector disposed outside the emitter and the receiver and formed with first and second slanted reflection planes; and

10       said emitter including a light-emitting element having an optical axis thereof deviating from an imaginary line connecting the emitter and the receiver toward the reflector such that a ratio between incident intensities of first and second optical signals, emitted from the emitter, reflected individually by the first and second slanted reflection planes and then entering the receiver, is equal to or higher than a  
15       predetermined value at or above which a faulty optical signal transmission is not caused.

20       7. The optical signal transmission device according to claim 6, wherein said receiver includes a light-receiving element for receiving the first and second optical signals, and at least one of the light-emitting element of the emitter and the light-receiving element of the receiver is disposed upward.

8. The optical signal transmission device according to claim 6, wherein said predetermined value is 25%.

25       9. The optical signal transmission device according to claim 6, wherein the optical axis of the light-emitting element is set to be directed to between the first and second slanted reflection planes.

30       10. The optical signal transmission device according to claim 6, wherein said reflector is formed with a curved reflection plane.